# CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

**NABL** - Accredited Laboratory as per ISO / IEC-17025 :2005

T-2377


Job No.: CTCE/BBMP/W.No.11/BBU/CSR-04/015g/CEMENT/2016-17 Date: 19.04.2016

## TEST REPORT ON CEMENT

| | | |
|---|---|---|
| * CUSTOMER | : | **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore. |
| *AGENCY | : | **Mr. B.B. Umesh,** #385/1, Near Anjaneya Temple, Bettahalasur Village & (P), Bangalore-57. |
| *NAME OF THE WORK | : | Improvements and Asphalting to Roads Kuvempunagara 1st Stage in Ward No. 11 (Kuvempunagara), Vidyaranyapura Sub Division, BBMP, Bangalore. |
| *REFERENCE | : | EE/BTP/BBMP/E-PMT/222/2015-16 Dated : 16.02.2016 |
| SAMPLE ID | : | Cement |
| SAMPLE RECEIVED ON | : | 18.04.2016 |
| PERIOD OF TESTING | : | 18.04.2016 to 19.04.2016 |

The results of the tests conducted on the cement sample are as follows:

| Sl. No | Descriptions | Test Method as per IS | Test Result | Requirements as per IS: 8112-2013 |
|---|---|---|---|---|
| 1 | Standard Consistency | IS-4031 (Part -4) 1988(RA-2009) | 29.0 0 % | - |
| 2 | a) Initial Setting Time | IS-4031 (Part -5) 1988(RA-2009) | 160 Minutes | Not Less than 30 Minutes |
| | b) Final Setting Time | IS-4031 (Part -5) 1988(RA-2009) | 490 Minutes | Not More than 600 Minutes |
| 3 | Soundness by Le Chartlier Method | IS-4031 (Part-3) 1988(RA-2009) | 1 mm | Not more than 10mm |

*Information is furnished by the Customer/Representative.

Note:

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⇒ The results indicated above are based on the tests carried out on the samples received in the laboratory.

⇒ Any Query regarding the report must be reported within 30 days from the date of testing.

*********

VISHWANATH .C
Quality Manager


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Building & Highway Material Testing Laboratory

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T-2377


Job No.: CTCE/BBMP/W.No.11/BBU/CSR-04/015g/SAND-Gradation/2016-17 : 19.04.2016

## TEST REPORT ON DETERMINATION GRADATION OF FINE AGGREGATES

*** Customer** : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

*** Agency** : **Mr. B.B. Umesh,**
#385/1, Near Anjaneya Temple, Bettahalasur Village & (P), Bangalore-57.

*** Name of Work** : Improvements and Asphalting to Roads Kuvempunagara 1st Stage in Ward No. 11 (Kuvempunagara), Vidyaranyapura Sub Division, BBMP, Bangalore.

**Reference** : EE/BTP/BBMP/E-PMT/222/2015-16 Dated : 16.02.2016

**Technical Reference** : IS : 2386 Part 1 - 1963 RA-2007

**Sample ID** : Fine Aggregates

**Sample Received on** : 18.04.2016

**Date of Testing** : 19.04.2016

Total Wt. of Aggregates in gms **1000**

| Is Sieve Size in mm | Cumulative Weight Passing in % | Specific Limits as per IS 383-1970 (RA- 2007) | | | |
|---|---|---|---|---|---|
| | | Zone-I | Zone-II | Zone-III | Zone-IV |
| 10 | 100 | 100 | 100 | 100 | 100 |
| 4.75 | 94.40 | 90-100 | 90-100 | 90-100 | 95-100 |
| 2.36 | 77.30 | 60-95 | 75-100 | 85-100 | 95-100 |
| 1.18 | 58.40 | 30-70 | 55-90 | 75-100 | 90-100 |
| 600 Micron | 30.10 | 15-34 | 35-59 | 60-79 | 80-100 |
| 300 Micron | 12.90 | 5-20 | 8-30 | 12-40 | 15-50 |
| 150 Micron | 3.30 | 0-10 | 0-10 | 0-10 | 0-15 |

* Information is furnished by the Customer/Representative

**Remarks :** This sample is under Zone-I specific limits.

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JAS-ANZ BSCIC ISO 9001 REGISTERED


Job No.: CTCE/BBMP/W.No.11/BBU/WMM/Gradation/2016-17

22.04.2016

## GRADATION FOR WMM
## MORTH TABLE-400-11

**Customer** : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

**Agency** : **Mr. B.B. Umesh,**
#385/1, Near Anjaneya Temple, Bettahalasur Village & (P), Bangalore-57.

**Name of Work** : Improvements and Asphalting to Roads Kuvempunagara 1st Stage in Ward No. 11 (Kuvempunagara), Vidyaranyapura Sub Division, BBMP, Bangalore.

**Reference** : EE/BTP/BBMP/E-PMT/222/2015-16 Dated : 16.02.2016

Date of Testing : 22.04.2016

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): 8534

| Is Sieve Size in mm | Weight Retained (gm) | Cumulative Weight Retained (gm) | Cumulative % of Retained | Cumulative % of Passing | Spec.Limits |
|---|---|---|---|---|---|
| 53 | 0 | 0 | 0 | 100 | 100 |
| 45 | 228 | 228 | 2.7 | 97.3 | 95-100 |
| 22.4 | 2658 | 2886 | 33.8 | 66.2 | 60-80 |
| 11.2 | 1321 | 4207 | 49.3 | 50.7 | 40-60 |
| 4.75 | 1209 | 5416 | 63.5 | 36.5 | 25-40 |
| 2.36 | 999 | 6415 | 75.2 | 24.8 | 15-30 |
| 0.600 | 935 | 7350 | 86.1 | 13.9 | 8-22 |
| 0.075 | 984 | 8334 | 97.7 | 2.3 | 0-8 |

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Job No.: CTCE/BBMP/W.No.11/BBU/WMM/Gradation/2016-17

23.04.2016

## GRADATION FOR WMM
## MORTH TABLE-400-11

**Customer** : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

**Agency** : **Mr. B.B. Umesh,**
#385/1, Near Anjaneya Temple, Bettahalasur Village & (P), Bangalore-57.

**Name of Work** : Improvements and Asphalting to Roads Kuvempunagara 1st Stage in Ward No. 11 (Kuvempunagara), Vidyaranyapura Sub Division, BBMP, Bangalore.

**Reference** : EE/BTP/BBMP/E-PMT/222/2015-16 Dated : 16.02.2016

Date of Testing : 23.04.2016

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): 8522

| Is Sieve Size in mm | Weight Retained (gm) | Cumulative Weight Retained (gm) | Cumulative % of Retained | Cumulative % of Passing | Spec.Limits |
|---|---|---|---|---|---|
| 53 | 0 | 0 | 0 | 100 | 100 |
| 45 | 230 | 230 | 2.7 | 97.3 | 95-100 |
| 22.4 | 2651 | 2881 | 33.8 | 66.2 | 60-80 |
| 11.2 | 1318 | 4199 | 49.3 | 50.7 | 40-60 |
| 4.75 | 1216 | 5415 | 63.5 | 36.5 | 25-40 |
| 2.36 | 992 | 6407 | 75.2 | 24.8 | 15-30 |
| 0.600 | 935 | 7342 | 86.2 | 13.8 | 8-22 |
| 0.075 | 980 | 8322 | 97.7 | 2.3 | 0-8 |

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Job No.: CTCE/BBMP/W.No.11/BBU/WMM/Gradation/2016-17

27.04.2016

## GRADATION FOR WMM
## MORTH TABLE-400-11

**Customer** : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

**Agency** : **Mr. B.B. Umesh,**
#385/1, Near Anjaneya Temple, Bettahalasur Village & (P), Bangalore-57.

**Name of Work** : Improvements and Asphalting to Roads Kuvempunagara 1st Stage in Ward No. 11 (Kuvempunagara), Vidyaranyapura Sub Division, BBMP, Bangalore.

**Reference** : EE/BTP/BBMP/E-PMT/222/2015-16 Dated : 16.02.2016

Date of Testing : 27.04.2016

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): 8521

| Is Sieve Size in mm | Weight Retained (gm) | Cumulative Weight Retained (gm) | Cumulative % of Retained | Cumulative % of Passing | Spec.Limits |
|---|---|---|---|---|---|
| 53 | 0 | 0 | 0 | 100 | 100 |
| 45 | 235 | 235 | 2.8 | 97.2 | 95-100 |
| 22.4 | 2652 | 2887 | 33.9 | 66.1 | 60-80 |
| 11.2 | 1323 | 4210 | 49.4 | 50.6 | 40-60 |
| 4.75 | 1221 | 5431 | 63.7 | 36.3 | 25-40 |
| 2.36 | 987 | 6418 | 75.3 | 24.7 | 15-30 |
| 0.600 | 923 | 7341 | 86.2 | 13.8 | 8-22 |
| 0.075 | 980 | 8321 | 97.7 | 2.3 | 0-8 |

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Job No.: CTCE/BBMP/W.No.11/BBU/WMM/Gradation/2016-17

29.04.2016

## GRADATION FOR WMM
## MORTH TABLE-400-11

**Customer** : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

**Agency** : **Mr. B.B. Umesh,**
#385/1, Near Anjaneya Temple, Bettahalasur Village & (P), Bangalore-57.

**Name of Work** : Improvements and Asphalting to Roads Kuvempunagara 1st Stage in Ward No. 11 (Kuvempunagara), Vidyaranyapura Sub Division, BBMP, Bangalore.

**Reference** : EE/BTP/BBMP/E-PMT/222/2015-16 Dated : 16.02.2016

Date of Testing : 29.04.2016

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): 8544

| Is Sieve Size in mm | Weight Retained (gm) | Cumulative Weight Retained (gm) | Cumulative % of Retained | Cumulative % of Passing | Spec.Limits |
|---|---|---|---|---|---|
| 53 | 0 | 0 | 0 | 100 | 100 |
| 45 | 260 | 260 | 3.0 | 97.0 | 95-100 |
| 22.4 | 2671 | 2931 | 34.3 | 65.7 | 60-80 |
| 11.2 | 1328 | 4259 | 49.8 | 50.2 | 40-60 |
| 4.75 | 1201 | 5460 | 63.9 | 36.1 | 25-40 |
| 2.36 | 989 | 6449 | 75.5 | 24.5 | 15-30 |
| 0.600 | 923 | 7372 | 86.3 | 13.7 | 8-22 |
| 0.075 | 972 | 8344 | 97.7 | 2.3 | 0-8 |

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Job No.: CTCE/BBMP/W.No.11/BBU/WMM/AIV/2016-17 22.04.2016

## Aggregate Impact Value

IS: 2386 Part IV

| | |
|---|---|
| **Customer** | **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore. |
| **Agency** | **Mr. B.B. Umesh,** #385/1, Near Anjaneya Temple, Bettahalasur Village & (P), Bangalore-57. |
| **Name of the Work** | Improvements and Asphalting to Roads Kuvempunagara 1st Stage in Ward No. 11 (Kuvempunagara), Vidyaranyapura Sub Division, BBMP, Bangalore. |
| **Reference** | EE/BTP/BBMP/E-PMT/222/2015-16 Dated : 16.02.2016 |
| **Source / Location** | WMM Plant |
| **Type of Mix** | Wet Mix macadam |
| **Date of Testing** | 22.04.2016 |

| Sl No. | Details | Trial No. 1 | Trial No. 2 | Average |
|---|---|---|---|---|
| 1 | Total weight of aggregate sample filling the cylindrical measure = $W_1$ g | 379 | 376 | |
| 2 | Weight of agregate passing 2.36 mm sieve after the test = $W_2$ g | 75 | 77 | |
| 3 | Weight of aggregate retained 2.36 mm sieve after the test = $W_3$ g | 356 | 361 | |
| 4 | Aggregate Impact value = percent fines | 19.79 | 20.48 | |
| | 100* ($W_2/W_1$)% | | | 20.13 |

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

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BSCIC ISO 9001 REGISTERED JAS-ANZ


Job No.: CTCE/BBMP/W.No.11/BBU/WMM/S-T/2016-17 22.04.2016

## DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

| | |
|---|---|
| Customer | **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore. |
| Agency | **Mr. B.B. Umesh,** #385/1, Near Anjaneya Temple, Bettahalasur Village & (P), Bangalore-57. |
| Name of Work | Improvements and Asphalting to Roads Kuvempunagara 1st Stage in Ward No. 11 (Kuvempunagara), Vidyaranyapura Sub Division, BBMP, Bangalore. |
| Reference | EE/BTP/BBMP/E-PMT/222/2015-16 Dated : 16.02.2016 |
| Technical Reference | IS 2386(Part 1) 1963 (RA 2011) |
| Type of Mix | Wet Mix Macadam |
| Date of Testing | 22.04.2016 |

Result : Flakiness Index = **12.11%**

Elongation Index = **13.15%**

**Result : Combined Flakiness & Elongation index** **25.26%**

**Comments:**

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

**Note:**

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Job No.: CTCE/BBMP/W.No.11/BBU/SDBC/Bit/2016-17 20.05.2016

## BITUMEN CONTENT DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

**AS per IRC:SP:-11-1984**

| | |
|---|---|
| CLIENT | **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore. |
| AGENCY | **Mr. B.B. Umesh,** #385/1, Near Anjaneya Temple, Bettahalasur Village & (P), Bangalore-57. |
| NAME OF THE WORK | Improvements and Asphalting to Roads Kuvempunagara 1st Stage in Ward No. 11 (Kuvempunagara), Vidyaranyapura Sub Division, BBMP, Bangalore. |
| REFERENCE | EE/BTP/BBMP/E-PMT/222/2015-16 Dated : 16.02.2016 |
| SAMPLE I/D | Asphalting to Roads Kuvempunagara 1st Stage in Ward No. 11 |
| DATE OF TESTING | 20.05.2016 |

**BITUMEN CONTENT DETERMINATION**

| Description | Trail 1 | Trail 2 |
|---|---|---|
| 1. Weight of Mixture before Test, g | 500 | 500 |
| 2. Weight of Mixture after Test, g | 476 | 473 |
| 3. Weight of Asphalt and Mineral matter Extracted, g | - | - |
| 4. Weight of Mineral Matter, g. | - | - |
| 5. Weight of Ash, g | | |
| 6. Weight of Bitumen Extracted, g. (corrected) | 24 | 27.00 |
| 7. Bitumen content in % | 4.80 | 5.40 |
| 8. Average | **5.10** | |

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Job No.: CTCE/BBMP/W.No.11/BBU/SDBC/Bit/2016-17 20.05.2016

## BITUMEN CONTENT GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

**As per IS2386 and IRC:SP:11-1984**

| | |
|---|---|
| CLIENT | **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore. |
| AGENCY | **Mr. B.B. Umesh,** #385/1, Near Anjaneya Temple, Bettahalasur Village & (P), Bangalore-57. |
| NAME OF THE WORK | Improvements and Asphalting to Roads Kuvempunagara 1st Stage in Ward No. 11 (Kuvempunagara), Vidyaranyapura Sub Division, BBMP, Bangalore. |
| REFERENCE | EE/BTP/BBMP/E-PMT/222/2015-16 Dated : 16.02.2016 |
| SAMPLE I/D | Asphalting to Roads Kuvempunagara 1st Stage in Ward No. 11 |
| DATE OF TESTING | 20.05.2016 |

GRADATION AFTER EXTRACTION

| Sieve Size in mm | Trail 1 | | | | Specified Limits as per MORTH specification table 500-15 (Grading-2) |
|---|---|---|---|---|---|
| | Weight Retained, gm | % Retained | %Cummulative Retained | % Passing | |
| 13.2 | 0 | 0 | 0 | 100 | 100 |
| 9.5 | 35.56 | 7.47 | 7.47 | 92.53 | 90-100 |
| 4.75 | 260.49 | 54.72 | 62.20 | 37.80 | 35-51 |
| 2.36 | 51.49 | 10.82 | 73.01 | 26.99 | 24-39 |
| 1.18 | 43.56 | 9.15 | 82.16 | 17.84 | 15-30 |
| 0.3 | 32.47 | 6.82 | 88.99 | 11.01 | 9-19 |
| 0.075 | 27.36 | 5.75 | 94.73 | 5.27 | 3-8 |

| Sieve Size in mm | Trail 2 | | | | Specified Limits as per MORTH specification table 500-15 (Grading-2) |
|---|---|---|---|---|---|
| | Weight Retained, gm | % Retained | %Cummulative Retained | % Passing | |
| 13.2 | 0 | 0 | 0 | 100 | 100 |
| 9.5 | 29.46 | 6.23 | 6.23 | 93.77 | 90-100 |
| 4.75 | 250.47 | 52.95 | 59.18 | 40.82 | 35-51 |
| 2.36 | 58.96 | 12.47 | 71.65 | 28.35 | 24-39 |
| 1.18 | 37.56 | 7.94 | 79.59 | 20.41 | 15-30 |
| 0.3 | 33.46 | 7.07 | 86.66 | 13.34 | 9-19 |
| 0.075 | 40.59 | 8.58 | 95.24 | 4.76 | 3-8 |

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JAS-ANZ BSCIC ISO 9001 REGISTERED


Job No.: CTCE/BBMP/W.No.11/BBU/SDBC/Bit/2016-17 21.05.2016

## BITUMEN CONTENT DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

**AS per IRC:SP:-11-1984**

| | |
|---|---|
| CLIENT | **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore. |
| AGENCY | **Mr. B.B. Umesh,** #385/1, Near Anjaneya Temple, Bettahalasur Village & (P), Bangalore-57. |
| NAME OF THE WORK | Improvements and Asphalting to Roads Kuvempunagara 1st Stage in Ward No. 11 (Kuvempunagara), Vidyaranyapura Sub Division, BBMP, Bangalore. |
| REFERENCE | EE/BTP/BBMP/E-PMT/222/2015-16 Dated : 16.02.2016 |
| SAMPLE I/D | Asphalting to Roads Kuvempunagara 1st Stage in Ward No. 11 |
| DATE OF TESTING | 21.05.2016 |

### BITUMEN CONTENT DETERMINATION

| Description | Trail 1 | Trail 2 |
|---|---|---|
| 1. Weight of Mixture before Test, g | 500 | 500 |
| 2. Weight of Mixture after Test, g | 476 | 473.2 |
| 3. Weight of Asphalt and Mineral matter Extracted, g | - | - |
| 4. Weight of Mineral Matter, g. | - | - |
| 5. Weight of Ash, g | | |
| 6. Weight of Bitumen Extracted, g. (corrected) | 24 | 26.80 |
| 7. Bitumen content in % | 4.80 | 5.36 |
| 8. Average | **5.08** | |

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Job No.: CTCE/BBMP/W.No.11/BBU/SDBC/Bit/2016-17 21.05.2016

## BITUMEN CONTENT GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

**As per IS2386 and IRC:SP:11-1984**

| | |
|---|---|
| CLIENT | **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore. |
| AGENCY | **Mr. B.B. Umesh,** #385/1, Near Anjaneya Temple, Bettahalasur Village & (P), Bangalore-57. |
| NAME OF THE WORK | Improvements and Asphalting to Roads Kuvempunagara 1st Stage in Ward No. 11 (Kuvempunagara), Vidyaranyapura Sub Division, BBMP, Bangalore. |
| REFERENCE | EE/BTP/BBMP/E-PMT/222/2015-16 Dated : 16.02.2016 |
| SAMPLE I/D | Asphalting to Roads Kuvempunagara 1st Stage in Ward No. 11 |
| DATE OF TESTING | 21.05.2016 |

### GRADATION AFTER EXTRACTION

| Sieve Size in mm | Trail 1 | | | | Specified Limits as per MORTH specification table 500-15 (Grading-2) |
|---|---|---|---|---|---|
| | Weight Retained, gm | % Retained | %Cummulative Retained | % Passing | |
| 13.2 | 0 | 0 | 0 | 100 | 100 |
| 9.5 | 37.56 | 7.89 | 7.89 | 92.11 | 90-100 |
| 4.75 | 261.23 | 54.88 | 62.77 | 37.23 | 35-51 |
| 2.36 | 55.49 | 11.66 | 74.43 | 25.57 | 24-39 |
| 1.18 | 45.57 | 9.57 | 84.00 | 16.00 | 15-30 |
| 0.3 | 28.56 | 6.00 | 90.00 | 10.00 | 9-19 |
| 0.075 | 28.46 | 5.98 | 95.98 | 4.02 | 3-8 |

| Sieve Size in mm | Trail 2 | | | | Specified Limits as per MORTH specification table 500-15 (Grading-2) |
|---|---|---|---|---|---|
| | Weight Retained, gm | % Retained | %Cummulative Retained | % Passing | |
| 13.2 | 0 | 0 | 0 | 100 | 100 |
| 9.5 | 33.46 | 7.07 | 7.07 | 92.93 | 90-100 |
| 4.75 | 251.46 | 53.14 | 60.21 | 39.79 | 35-51 |
| 2.36 | 59.46 | 12.57 | 72.78 | 27.22 | 24-39 |
| 1.18 | 38.49 | 8.13 | 80.91 | 19.09 | 15-30 |
| 0.3 | 35.46 | 7.49 | 88.40 | 11.60 | 9-19 |
| 0.075 | 41.56 | 8.78 | 97.19 | 2.81 | 3-8 |

**Note:**

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Þ Any Query regarding the report must be reported within 30 days from the date of testing.

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# CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

An ISO 9001:2008 Certified Company

**NABL** - Accredited Laboratory as per ISO / IEC-17025 : 2005


Job No.: CTCE/BBMP/W.No.11/BBU/SDBC/AIV/2016-17 20.05.2016

## Aggregate Impact Value

IS: 2386 Part IV

| | |
|---|---|
| **Customer** | **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore. |
| **Agency** | **Mr. B.B. Umesh,** #385/1, Near Anjaneya Temple, Bettahalasur Village & (P), Bangalore-57. |
| **Name of the Work** | Improvements and Asphalting to Roads Kuvempunagara 1st Stage in Ward No. 11 (Kuvempunagara), Vidyaranyapura Sub Division, BBMP, Bangalore. |
| **Reference** | EE/BTP/BBMP/E-PMT/222/2015-16 Dated : 16.02.2016 |
| **Source / Location** | Hot Mix Plant, Bangalore |
| **Type of Mix** | Semi Dense Bituminous Concrete |
| **Date of Testing** | 20.05.2016 |

| Sl No. | Details | Trial No. 1 | Trial No. 2 | Average |
|---|---|---|---|---|
| 1 | Total weight of aggregate sample filling the cylindrical measure = $W_1$ g | 385 | 383 | |
| 2 | Weight of agregate passing 2.36 mm sieve after the test = $W_2$ g | 78 | 79 | |
| 3 | Weight of aggregate retained 2.36 mm sieve after the test = $W_3$ g | 303 | 305 | |
| 4 | Aggregate Impact value = percent fines 100* ($W_2/W_1$)% | 20.26 | 20.63 | 20.44 |

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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Job No.: CTCE/BBMP/W.No.11/BBU/SDBC/Shape_T/2016-17 : 20.05.2016

## DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

| | |
|---|---|
| Customer | : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore. |
| Agency | : **Mr. B.B. Umesh,** #385/1, Near Anjaneya Temple, Bettahalasur Village & (P), Bangalore-57. |
| Name of Work | : Improvements and Asphalting to Roads Kuvempunagara 1st Stage in Ward No. 11 (Kuvempunagara), Vidyaranyapura Sub Division, BBMP, Bangalore. |
| Reference | : EE/BTP/BBMP/E-PMT/222/2015-16 Dated : 16.02.2016 |
| Technical Reference | : IS 2386(Part 1) 1963 (RA 2007) |
| Type of Mix | : Semi Dense Bituminous Concrete |
| Date of Testing | : 20.05.2016 |

Result : Flakiness Index = **11.23%**

Elongation Index = **13.36%**

Result : Combined Flakiness & Elongation index **24.59%**

Comments:

Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W.No.11/BBU/SDBC/Stripping/2016-17 20.05.2016

## Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

| | |
|---|---|
| **Customer** | **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore. |
| **Agency** | **Mr. B.B. Umesh,** #385/1, Near Anjaneya Temple, Bettahalasur Village & (P), Bangalore-57. |
| **Name of the work** | Improvements and Asphalting to Roads Kuvempunagara 1st Stage in Ward No. 11 (Kuvempunagara), Vidyaranyapura Sub Division, BBMP, Bangalore. |
| **Reference** | EE/BTP/BBMP/E-PMT/222/2015-16 Dated : 16.02.2016 |
| **Type of Mix** | Semi Dense Bituminous Concrete |
| **Date of Testing** | 20.05.2016 |

Type of binder : 80/100
Percentage of binder used : 5.0% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.0 g
Temperature of water-bath : 40° C

| Observation Number | Stripping, Percentage | Average, Percentage | Average Retained Coating, % |
|---|---|---|---|
| 1 | 2.8 | 3.03 | 96.97 |
| 2 | 3.2 | | |
| 3 | 3.1 | | |

Comments:

→ Minimum allowable Aggregate retained coating for Semi Dense Bituminous Concrete is 95%

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Job No.: CTCE/BBMP/W.No.11/BBU/SDBC/Sp_Wa/2016-17

20.05.2016

## Specific Gravity And Water Absorption Test

IS: 2386 Part III

| | |
|---|---|
| **Customer** | **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore. |
| **Agency** | **Mr. B.B. Umesh,** #385/1, Near Anjaneya Temple, Bettahalasur Village & (P), Bangalore-57. |
| **Name of the Work** | Improvements and Asphalting to Roads Kuvempunagara 1st Stage in Ward No. 11 (Kuvempunagara), Vidyaranyapura Sub Division, BBMP, Bangalore. |
| **Reference** | EE/BTP/BBMP/E-PMT/222/2015-16 Dated : 16.02.2016 |
| **Type of Mix** | Semi Dense Bituminous Concrete |
| **Source / Location** | Hotmix Plant, Bangalore |
| **Date of Testing** | 20.05.2016 |

| Sl. No. | Details | Notation | Test Number | | | Mean Value |
|---|---|---|---|---|---|---|
| | | | Test 1 | Test 2 | Test 3 | |
| 1 | Weight of aggregate suspended in water with the basket | $W_1$ g | 2008 | 2006 | 2005 | |
| 2 | Weight of basket suspended in water | $W_2$ g | 755 | 755 | 755 | |
| 3 | Weight of saturated aggregate in water | $(W_1 - W_2) = W_s$ g | 1253 | 1251 | 1250 | |
| 4 | Weight of saturated surface dry aggregate in air | $W_3$ g | 2015 | 2016 | 2021 | |
| 5 | Weight of water equal to the volume of the aggregate | $(W_3 - W_S)$ g | 762 | 765 | 771 | |
| 6 | Weight of oven dried aggregate | $W_4$ g | 2003 | 2006 | 2008 | |
| 7 | Specific Gravity | $W_4/(W_3-W_S)$ | 2.629 | 2.622 | 2.604 | 2.618 |
| 8 | Apparent Specific gravity | $W_4/(W_4-W_S)$ | 2.671 | 2.657 | 2.649 | 2.659 |
| 9 | Water Absorption | $((W_3-W_4)*100)/W_4$ | 0.60% | 0.50% | 0.65% | 0.58% |

**Comments:**

→ Maximum allowable Aggregate Water absorption value for Semi Dense Bituminous Concrete is 2.0

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